

**What is claimed is:**

1. A bit rate agile communication system comprising:
  - a baseband signal processing network receiving parallel baseband signal streams and generating combined Time Constrained Signal (TCS) response and Long Response (LR) filtered in-phase and quadrature-phase baseband signals; and
  - a quadrature modulator receiving and quadrature modulating said Time Constrained Signal (TCS) response and Long Response (LR) filtered in-phase and quadrature-phase baseband signals to generate a quadrature modulated bit rate agile output signal.
2. The bit rate agile system in Claim 1, further comprising:
  - a transmit amplifier receiving said quadrature modulated output signal and generating an amplified transmit signal for coupling to a transmission medium.
3. The bit rate agile system in Claim 1, further comprising:
  - a demodulator receiving and demodulating said bit rate agile transmit signal.
4. A Bit Rate Agile (BRA) structure comprising:
  - a baseband signal processing network for receiving baseband signal streams and providing cascaded Bit Rate Agile (BRA) Time Constrained Signal (TCS) response and Long Response (LR) filtered in phase and quadrature phase baseband signals;
  - a Quadrature Modulator serving to quadrature modulate said cascaded Time Constrained Signal (TCS) response and Long Response (LR) filtered in phase and quadrature phase baseband signals;
  - an interface transmitter port to provide said quadrature modulated signal to the transmission medium;
  - an interface receiver port to provide connection of the said filtered quadrature modulated signal to the demodulator; and
  - a demodulator structure to serve for signal demodulation having Bit Rate Agile (BRA) demodulation filters Mis-Matched (MM) to that of the modulator filters.

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5. A structure comprising:  
2 a input port for receiving baseband signals; and  
a baseband signal processing network for receiving said baseband signals and  
4 providing cross-correlated bit rate agile cascaded mis-matched (ACM) processed and  
filtered in-phase and quadrature-phase baseband signals.

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6. A signal processing, modulation, transmission, signal reception and demodulation  
8 system, for Bit Rate Agile (BRA), Modulation Demodulation (Modem) Format Selectable  
(MFS) and Code Selectable (CS) systems comprising:

10 (a) means for input port for receiving input data;  
(b) splitter means serving for BRA, MFS and CS signal splitting, having an input  
12 coupled to said input port, and serving to split said input data into baseband signal  
streams;

14 (c) means for BRA, MFS and CS baseband signal processing;  
(d) means for receiving said baseband signal stream and providing for BRA, MFS  
16 and CS systems changeable amounts of cross-correlation between Time Constrained  
Signal (TCS) response processors combined with TCS and Long Response (LR)  
18 processors;

(e) means for cross-correlated processed in phase (I) and quadrature (Q) phase  
20 baseband signals for quadrature modulation to the I and Q input ports of the Quadrature  
Modulator (QM);

22 (f) means for an interface unit to provide said quadrature modulated data to the  
transmission medium;

24 (g) means for a receiver interface unit for connection of the received cross-  
correlated signal to the BRA and MFS demodulator;

26 (h) means for BRA, MFS and CS demodulation; and

(i) means for post-demodulation Mis-Matched (MM) filtering of the BRA MFS  
28 and CS demodulated signals in which the MM demodulator filters are mis-matched to that  
of the BRA and MFS filters.

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7. A structure comprising:  
32 a input port for receiving baseband signals; and

a baseband signal processing network for receiving said baseband signals and providing cross-correlated bit rate agile Peak Limited(PL) in-phase and quadrature-phase baseband signals.

8. A structure for Orthogonal Frequency Division Multiplexed (OFDM) signals comprising:

a input port for receiving OFDM baseband signals; and

a baseband signal processing network for receiving said baseband signals and providing cross-correlated filtered in-phase and quadrature-phase baseband signals.

9. A Bit Rate Agile (BRA) structure comprising:

a input port for receiving single or plurality of baseband binary input signals;

a baseband signal processing network for receiving said baseband binary signals and providing combined Time Constrained Signal(TCS) response and Long Response (LR) filtered multi-level in-phase and quadrature-phase baseband signals; and

a Quadrature Modulator serving to quadrature modulate said Time Constrained Signal (TCS) response and Long Response (LR) filtered in-phase and quadrature-phase baseband signals;

a transmit amplifier to provide said quadrature modulated signal to the transmission medium;

an interface receiver port to provide connection of the said filtered quadrature modulated signal to the demodulator and

a demodulator structure to serve for signal demodulation.